12-4 Troubleshooting

If an error occurs in the machine, determine the error conditions from the error displays and operation state, identify the cause of the error, and take appropriate measures.

12-4-1 Troubleshooting with Error Displays

Error List

Error No. (hex)		Name	Cause	Measures
Main	Sub			
11	0	Control Power Supply Undervoltage	The voltage between the positive and negative terminals in the control power supply converter dropped below the specified value. 100-V products: Approx. 70 VDC (Approx. 30 VAC) 200-V products: Approx. 145 VDC (Approx. 100 VAC) 400-V products: Approx. 15 VDC • The power supply voltage is low. A momentary power interruption occurred. • Insufficient power supply capacity: the power supply voltage dropped because there was inrush current when the main power supply was turned ON. • The Servo Drive is faulty (circuit fault).	Measure the voltage between the L1C and L2C lines on the connectors and the terminal block. • Increase the power supply voltage. Change the power supply. • Increase the power supply capacity. • Replace the Servo Drive.
12	0	Overvoltage	The power supply voltage exceeded the allowable input voltage range, causing the voltage between the positive and negative terminals in the converter to exceed the specified value. The power supply voltage is high. The voltage was suddenly increased by the phase advance capacitor or the uninterruptible power supply (UPS). 100-V products: Approx. 200 VDC (Approx. 140 VAC) 200-V products: Approx. 400 VDC (Approx. 280 VAC) 400-V products: Approx. 800 VDC (Approx. 560 VAC) • The Regeneration Resistor wiring is broken. • The External Regeneration Resistor is inappropriate and cannot absorb all of the regenerative energy. The load inertia is too large, gravitational torque on the vertical axis is too large, or there is some other problem to absorb the regenerative energy. • The Servo Drive is faulty (circuit fault).	Measure the voltage between the connector (L1, L2, and L3) lines. Input the correct voltage. Remove the phase advance capacitor. • Use a tester to measure the resistance of the external resistor between the B1 and B2 terminals on the Servo Drive. If the resistance is infinite, the wiring is broken. Replace the external resistor. • Change the regeneration resistance and wattage to the specified values. (Calculate the regenerative energy and connect an External Regeneration Resistor with the required regeneration absorption capacity. Reduce the descent speed.) • Replace the Servo Drive.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
13	0	Main Circuit Power Supply Undervoltage (Undervoltage between positive and negative terminals)	If the Undervoltage Error Selection (3508 hex) is set to 1, a momentary power interruption occurred between L1 and L3 for longer than the value specified for the Momentary Hold Time (3509 hex). Alternatively, the voltage between the positive and negative terminals in the main power supply converter dropped below the specified value while the servo was ON. 100-V products: Approx. 80 VDC (Approx. 55 VAC) 200-V products: Approx. 110 VDC (Approx. 75 VAC) 400-V products: Approx. 180 VDC (Approx. 125 VAC)	Measure the voltage between the connector (L1, L2, and L3) lines.
			• The power supply voltage is low.	• Increase the power supply voltage. Change the power supply. Eliminate the cause of the failure of the electromagnetic contactor on the main circuit power supply, and then turn ON the power again.
	1	Main Power Supply Undervoltage (AC interruption detected)	• A momentary power interruption occurred.	• Check the setting of the Momentary Hold Time (3509 hex). Set each phase of the power supply correctly.
			• Insufficient power supply capacity: the power supply voltage dropped because there was inrush current when the main power supply was turned ON.	• Increase the power supply capacity. Refer to *2-3-1 Servo Drive Model Table* on page 2-8 for information on the power supply capacity.
			• Phase-failure: a Servo Drive with 3-phase input specifications was operated with single-phase power supply.	• Connect each phase (L1, L2, and L3) of the power supply correctly. Use L1 and L3 for single-phase 100 V and single-phase 200 V.
			• The Servo Drive is faulty (circuit fault).	• Replace the Servo Drive.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
14	0	Overcurrent	The current flowing through the converter exceeded the specified value.	
			• The Servo Drive is faulty (faulty circuit, faulty IGBT part, etc.).	• Disconnect the Servomotor cable, and turn ON the servo. If the problem immediately recurs, replace the Servo Drive with a new one.
			• The Servomotor cable is short-circuited between phases U, V, and W.	• Check to see if the Servomotor cable is short-circuited between phases U, V and W by checking for loose wire strands on the connector lead. Connect the Servomotor cable correctly.
			• The Servomotor cable is ground-faulted.	• Check the insulation resistance between phases U, V, and W of the Servomotor cable and the grounding wire of the Servomotor. If the insulation is faulty, replace the Servomotor.
			• Motor windings are burned out.	• Check the balance between the resistance of each wire of the Servomotor. If resistance is unbalanced, replace the Servomotor.
	1	IPM Error	• The Servomotor wiring contacts are faulty.	• Check for missing connector pins in Servomotor connections U, V, and W. If any loose or missing connector pins are found, secure them firmly.
			• The relay for the dynamic brake has been welded due to frequent servo ON/OFF operations.	• Replace the Servo Drive.Do not turn the servo ON for 3 minutes after using the dynamic brake.
			• The Servomotor is not suitable for the Servo Drive.	• Check model (capacity) of the Servomotor and the Servo Drive on the nameplates. Replace the Servomotor with a Servomotor that matches the Servo Drive.
			• The command input timing is the same as or earlier than the Servo ON timing.	• Wait at least 100 ms after the servo has been turned ON, then input commands.
			• The resistance of the connected External Regeneration Resistor is less than the minimum allowable value.	• Connect an External Regeneration Resistor whose resistance is more than the minimum allowable value.
15	0	Servo Drive Overheat	The temperature of the Servo Drive radiator or power elements exceeded the specified value.	
			• The ambient temperature of the Servo Drive exceeded the specified value.	• Improve the ambient temperature and the cooling conditions of the Servo Drive.
			• Overload	• Increase the capacities of the Servo Drive and the Servomotor. Set longer acceleration and deceleration times. Reduce the load.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
16	0	Overload	When the feedback value for torque command exceeds the overload level specified in the Overload Detection Level Setting (3512 hex), overload protection is performed according to the overload characteristics. • The load was heavy, the effective torque exceeded the rated torque, and operation continued too long. • Vibration or hunting occurred due to faulty gain adjustment. The Servomotor vibrates or makes unusual noise. The Inertia Ratio (3004 hex) setting is faulty. • The Servomotor wiring is incorrect or broken. • The machine was hit by an object, or the machine load suddenly became heavy. The machine was distorted. • The electromagnetic brake remains ON. • When multiple machines were wired, the wiring was incorrect and the Servomotor cable to was connected to a Servomotor for another axis.	Check if torque (current) waveforms oscillate or excessively oscillates vertically during analog output or communications. Check the overload warning display and the load rate through communications. • Increase the capacities of the Servo Drive and the Servomotor. Set longer acceleration and deceleration times. Reduce the load. • Readjust the gain. • Connect the Servomotor cable as shown in the wiring diagram. Replace the cable. • Remove the distortion from the machine. Reduce the load. • • Measure the voltage at the brake terminals. Turn OFF the brake. • Wire the Servomotor and the encoder correctly so that the wiring matches the axes.
			Refer to *3-2 Overload Characteristics (Electronic Thermal Function)* on page 3-35 for information on overload characteristics.	
18	0	Regeneration Overload	The regenerative energy exceeds the processing capacity of the Regeneration Resistor. • The regenerative energy during deceleration caused by a large load inertia increased the converter voltage, and then insufficient energy absorption by the Regeneration Resistor further increased the voltage. • The Servomotor rotation speed is too high to absorb the regenerative energy within the specified deceleration time. • The operating limit of the external resistor is limited to a 10% duty.	Check the load rate of the Regeneration Resistor through communications. This Regeneration Resistor cannot be used for continuous regenerative braking. • Check the operation pattern (speed monitor). Check the load rate of the Regeneration Resistor and check for the excessive regeneration warning display. Increase the capacities of the Servo Drive and the Servomotor, and length the deceleration time. Use an External Regeneration Resistor. • Check the operation pattern (speed monitor). Check the load rate of the Regeneration Resistor and the excessive regeneration warning display. Increase the capacities of the Servo Drive and the Servomotor, and lengthen the deceleration time. Reduce the Servomotor rotation speed. Use an External Regeneration Resistor. • Set the Regeneration Resistor Selection (3016 hex) to 2.
			Precautions for Correct Use Always provide a temperature fuse or other protective measure when setting the External Regeneration Resistor Setting (3017 hex) to 2. Otherwise, the Regeneration Resistor will not be protected, generate excessive heat, and be burnt.	
	1	Regeneration Tr Error	The Servo Drive regeneration drive Tr is faulty.	Replace the Servo Drive.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
21	0	Encoder Communications Disconnection Error	A disconnection was detected because communications between the encoder and the Servo Drive were stopped more frequently than the specified value.	Wire the encoder correctly as shown in the wiring diagram. Correct the connector pin connections.
	1	Encoder Communications Error	There was a communications error in data from the encoder. There was a data error mainly due to noise. The encode cable is connected, but a communications data error occurred.	• Provide the required encoder power supply voltage 5 VDC ±5% (4.75 to 5.25 V). Be careful especially when the encode cable is long. • If the Servomotor cable and the encoder cable are bundled together, separate them. • Connect the shield to FG.
23	0	Encoder Communications Data Error	No communications error occurred with the data from the encoder, but there is an error in the contents of the data. There was a data error mainly due to noise. The encode cable is connected, but a communications data error occurred.	• Provide the required encoder power supply voltage 5 VDC ±5% (4.75 to 5.25 V). Be careful especially when the encode cable is long. • If the Servomotor cable and the encoder cable are bundled together, separate them. • Connect the shield to FG.
24	0	Error Counter Overflow	Position error pulses exceeded the setting of the Following error window (6065 hex). • Motor operation does not follow the command. • The value of the Following error window (6065 hex) is small.	• Check to see if the Servomotor rotates according to the position command pulse. Check on the torque monitor to see if the output torque is saturated. Adjust the gain. Maximize the set values on the Positive torque limit value (60E0 hex) and the Negative torque limit value (60E1 hex). Wire the encoder as shown in the wiring diagram. Lengthen the acceleration and deceleration times. Reduce the load and the speed. • Increase the set value of object 6065 hex.
	1	Excessive Speed Deviation Error	The difference (speed deviation) between Motor Velocity Demand Value After Filtering and actual speed has exceeded the set value of the Excessive Speed Deviation Setting (3602 hex). **Note** When Motor Velocity Demand Value After Filtering is forced to 0 during an immediate stop due to halt or forward/reverse drive prohibition input, the speed deviation immediately increases The speed deviation also increases when the Motor Velocity Demand Value After Filtering starts. Therefore, provide enough margin when making the settings.	• Increase the set value of object 3602 hex. • Lengthen the acceleration time of the Motor Velocity Demand Value After Filtering. Alternatively, improve the tracking (following) performance by adjusting the gain. • Disable the Excessive Speed Deviation Setting. (3602 hex = 0)

Error No. (hex)		Name	Cause	Measures
Main	Sub			
25	0	Excessive Hybrid Deviation Error	During fully-closed control, the difference between the load position from the external encoder and the Servomotor position from the encoder was larger than the number of pulses set as the Hybrid Following Error Counter Overflow Level (3328 hex).	• Check the Servomotor and load connection. • Check the external encoder and Servo Drive connection. • When moving the load, check to see if the change in the Servomotor position (encoder feedback value) has the same sign as the change in the load position (external encoder feedback value). Check to see if the External Feedback Pulse Dividing Numerator and Denominator (3324 hex and 3325 hex), and External Feedback Pulse Direction Switching (3326 hex) are set correctly.
26	0	Overspeed	The Servomotor rotation speed exceeded the value set on the Overspeed Detection Level Setting (3513 hex).	• Do not give excessive speed commands. • Check the input frequency, dividing ratio, and multiplication ratio of the command pulse. • If overshooting occurred due to faulty gain adjustment, adjust the gain. • Wire the encoder as shown in the wiring diagram.
	1	Overspeed 2	The Servomotor rotation speed exceeded the value set for the Overspeed Detection Level Setting at Immediate Stop (3615 hex).	
27	1	Absolute Value Cleared **ABS**	The multi-rotation counter for the absolute encoder was cleared during USB communications by the CX-Drive.	• Check to see if the multi-rotation counter for the absolute encoder was cleared during USB communications by the CX-Drive. **Note** This operation is performed for safety and is not an error.
	4	Command Error	The position command variation after the electronic gear is higher than the specified value.	• Check to see if the position command variation is large. • Check the electronic gear ratio. • Check to see if the backlash compensation amount is too large.
	5	Command Generation Error	During position command processing, an error such as an “over the calculation range” error occurred.	Check to see if the electronic gear ratio, and the acceleration and deceleration rates meet the restrictions.
	6	Operation Command Duplicated	An attempt was made to establish EtherCAT communications (change from Init to Pre-Operational state) or to turn ON the servo from the controller (enable operation) while executing an FFT that operates with the Servo Drive alone or a trial run.	Check to see if EtherCAT communications is established or the servo is turned ON (enable operation) while an FFT or a trial run was being conducted.
	7	Position Data Initialized	A Config operation was performed or the multi-rotation counter was cleared for the absolute encoder during EtherCAT communications.	Check to see if Config operation was performed or the multi-rotation counter was cleared for the absolute encoder during EtherCAT communications. Note: This operation is performed for safety and is not an error.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
29	1	Error Counter Overflow 1 **ABS**	The value that is obtained by dividing the absolute encoder position (in pulses) by the electronic gear ratio exceeded $\pm 2^{31}$ (2,147,483,648) during the initialization of position data, after the control power was turned ON in absolute value mode, after a Config operation, after FFT was executed, or after a trial run was executed.	Review the operation range of the absolute external encoder position and the electronic gear ratio.
	2	Error Counter Overflow 2	The position error in pulses exceeded $\pm 2^{29}$ (536,870,912). Alternatively, the position error in command units exceeded $\pm 2^{30}$ (1,073,741,824).	• Check to see if the Servomotor rotates according to the position command. • Check on the torque monitor to see if the output torque is saturated. • Adjust the gain. • Maximize the set values on the Positive torque limit value (60E0 hex) and the Negative torque limit value (60E1 hex). • Wire the encoder as shown in the wiring diagram.
30 (st)	0	Safety Input Error	At least one of the input photocouplers for safety inputs 1 and 2 turned OFF.	Check the input wiring of safety inputs 1 and 2.
33	0	Interface Input Duplicate Allocation Error 1	There is a duplicate setting in the input signal (IN1, IN2, IN3, and IN4) function allocations.	Allocate the functions to the connector pins correctly.
	1	Interface Input Duplicate Allocation Error 2	There is a duplicate setting in the input signal (IN5, IN6, IN7, and IN8) function allocations.	
	2	Interface Input Function Number Error 1	There is an undefined number specification in the input signal (IN1, IN2, IN3, and IN4) function allocations. Alternatively, a logic setting error was detected.	
	3	Interface Input Function Number Error 2	There is an undefined number specification in the input signal (IN5, IN6, IN7, and IN8) function allocations. Alternatively, a logic setting error was detected.	
	4	Interface Output Function Number Error 1	There is an undefined number specification in the output signal (OUTM1) function allocation.	
	5	Interface Output Function Number Error 2	There is an undefined number specification in the output signal (OUTM2) function allocation.	
	8	External Latch Input Allocation Error	There is an error in the latch input function allocation. • The function was allocated to input signals other than IN5, IN6, or IN7. • The function was allocated to NC. • The function was not allocated for all control modes.	

Error No. (hex)		Name	Cause	Measures
Main	Sub			
34	0	Overrun Limit Error	The Servomotor exceeded the allowable operating range set in the Overrun Limit Setting (3514 hex) with respect to the position command input range. • The gain is not appropriate. • The set value of object 3514 hex is too small.	• Check the gains (the balance between position loop gain and speed loop gain) and the inertia ratio. • Increase the set value of object 3514 hex. Alternatively, set object 3514 hex to 0 to disable the protection function.
36	0 1 2	Object Error	Data in the Object Save Area was corrupted when the power supply was turned ON and data was read from the EEPROM.	• Reset all of the objects. • If this error occurs repeatedly, the Servo Drive may be faulty. In this case, replace the Servo Drive. Return the Servo Drive to the dealer that it was purchased from and ask for investigation and repair.
37	0 1 2	Object Corrupted	EEPROM write verification data was corrupted when the power supply was turned ON and data was read from the EEPROM.	The Servo Drive is faulty. Replace the Servo Drive. Return the Servo Drive to the dealer that it was purchased from and ask for investigation and repair.
38	0	Drive Prohibition Input Error 1	When the Drive Prohibition Input Selection (3504 hex) was set to 0, both the Forward Drive Prohibition Input (POT) and the Reverse Drive Prohibition Input (NOT) turned ON. When object 3504 hex was set to 2, either the Forward Drive Prohibition input or the Reverse Drive Prohibition input turned ON.	Check for any problems with the switches, wires, and power supplies that are connected to the Forward Drive Prohibition input or the Reverse Drive Prohibition input. In particular, check to see if the control signal power supply (12 to 24 VDC) turned ON too slowly.
	1	Drive Prohibition Input Error 2	When object 3504 hex was set to 0, EtherCAT communications were interrupted and either POT or NOT was ON, an operation command (such as a trial run or FFT) was received from the CX-Drive. Conversely, POT or NOT turned ON while operation was being performed for a CX-Drive operation command.	
40	0	Absolute encoder system down error **ABS**	The voltage of the built-in capacitor dropped below the specified value because the power supply to the encoder or the battery power supply was down.	Connect the battery power supply, and then clear the absolute encoder. Unless the absolute encoder is cleared, the error cannot be reset.
41	0	Absolute Encoder Counter Overflow Error **ABS**	The multi-rotation counter of the encoder exceeded the specified value.	• Set the Operation Switch When Using Absolute Encoder (3015 hex) to an appropriate value. • Make sure that the traveling distance from the origin of the machine is no more than 32,767 revolutions.
42	0	Absolute Encoder Overspeed Error **ABS**	The Servomotor rotation speed exceeded the specified value when only the battery power supply was used during a power interruption.	• Check the power supply voltage (5V ±5%) on the encoder side. • Check the connections to connector CN2. Unless the absolute encoder is cleared, the error cannot be reset.
43	0	Encoder Initialization Error	An encoder initialization error was detected.	Replace the Servomotor.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
44	0	Absolute Encoder 1-rotation Counter Error **ABS**	The encoder detected a 1-rotation counter error.	Replace the Servomotor.
45	0	Absolute Encoder Multi-rotation Counter Error **ABS**	The encoder detected a multi-rotation counter error.	Replace the Servomotor.
47	0	Absolute Encoder Status Error **ABS**	The rotation of the encoder was higher than the specified value when the power supply was turned ON.	Do not let the Servomotor move when the power supply is turned ON.
48	0	Encoder Phase-Z Error	A missing serial incremental encoder phase-Z pulse was detected. The encoder is faulty.	Replace the Servomotor.
49	0	Encoder CS Signal Error	A logic error was detected in the CS signal for serial incremental encoder. The encoder is faulty.	Replace the Servomotor.
50	0	External Encoder Connection Error	A disconnection was detected because communications between the external encoder and the Servo Drive were interrupted more than the specified number of times.	Wire the external encoder correctly as shown in the connection diagram. Correct the connector pin connections.
	1	External Encoder Communications Data Error	There was a communications error in data from external encoder. There was a data error mainly due to noise. The external encoder connection cable is connected, but a communications data error occurred.	• Provide the required external encoder power supply voltage 5 VDC ±5% (4.75 to 5.25 V). Be careful especially when the external encoder connection cable is long. • If the Servomotor cable and the external encoder connection cable are bundled together, separate them. • Connect the shield to FG. Refer to the external encoder connection diagram.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
51	0	External Encoder Status Error 0	Bit 0 of the external encoder error code (ALMC) was set to 1. Refer to the external encoder specifications.	Eliminate the cause of the error and then clear the external encoder error. Then, temporarily turn OFF the control power supply to reset.
	1	External Encoder Status Error 1	Bit 1 of the external encoder error code (ALMC) was set to 1. Refer to the external encoder specifications.	
	2	External Encoder Status Error 2	Bit 2 of the external encoder error code (ALMC) was set to 1. Refer to the external encoder specifications.	
	3	External Encoder Status Error 3	Bit 3 of the external encoder error code (ALMC) was set to 1. Refer to the external encoder specifications.	
	4	External Encoder Status Error 4	Bit 4 of the external encoder error code (ALMC) was set to 1. Refer to the external encoder specifications.	
	5	External Encoder Status Error 5	Bit 5 of the external encoder error code (ALMC) was set to 1. Refer to the external encoder specifications.	
55	0	Phase-A Connection Error	An error such as broken wiring was detected in the external encoder phase-A connection.	Check the external encoder phase A connection.
	1	Phase-B Connection Error	An error such as broken wiring was detected in the external encoder phase-B connection.	Check the external encoder phase-B connection.
	2	Phase-Z Connection Error	An error such as broken wiring was detected in the external encoder phase-Z connection.	Check the external encoder phase-Z connection.
83	–	Refer to *Troubleshooting Errors Related to EtherCAT Communications* on page 12-26.		
87	0	Immediate Stop Input Error	An Immediate Stop (STOP) signal was entered.	Check the Immediate Stop (STOP) signal wiring.
88	–	Refer to *Troubleshooting Errors Related to EtherCAT Communications* on page 12-26.		
90	–			
91	–			

Error No. (hex)		Name	Cause	Measures
Main	Sub			
92	0	Encoder Data Restoration Error	Initialization of internal position data was not processed correctly in semi-closed control mode and absolute value mode.	• Provide the required encoder power supply voltage 5 VDC ±5% (4.75 to 5.25 V). Be careful especially when the encode cable is long. • If the Servomotor cable and the encoder cable are bundled together, separate them. • Connect the shield to FG.
	1	External Encoder Data Restoration Error	Initialization of internal position data was not processed correctly in fully-closed control mode and absolute value mode.	• Provide the required external encoder power supply voltage 5 VDC ±5% (4.75 to 5.25 V). Be careful especially when the external encoder connection cable is long. • If the Servomotor cable and the external encoder connection cable are bundled together, separate them. • Connect the shield to FG. Refer to the external encoder connection diagram.
93	0	Object Setting Error 1	Electronic gear ratio exceeded the allowable range.	Check the object settings. The electronic gear ratio must be set between 1/1000 and 1000.
	2	Object Setting Error 2	External encoder ratio exceeded the allowable range.	Check the object settings. The external encoder ratio must be set between 1/40 and 160.
	3	External Encoder Connection Error	The set value of the External Feedback Pulse Type Selection (3323 hex) differs from the external encoder type that is actually connected for serial communications. Electronic gear ratio exceeded the allowable range.	Set object 3323 hex to conform with the external encoder type that is actually connected.

Error No. (hex)		Name	Cause	Measures
Main	Sub			
93 (continued)	4	Function Setting Error	The function that was set does not support the communications cycle. • The electronic gear object ratio was not 1:1 when the communications cycle was set to 250/500 μs. • Fully-closed Control Mode was selected when the communications cycle was set to 250 μs. • Homing mode (hm) was set in Modes of operation (6060 hex) when the communications cycle was set to 250 or 500 μs. • A mapping exceeding 20 bytes was set in an RxPDO when the communications cycle was set to 250 μs. • A mapping exceeding 12 bytes was set in an RxPDO during Fully-closed Control Mode. • Profile position mode (pp) or Homing mode (hm) was set in Modes of operation (6060 hex) when the communications cycle was set to 1 ms, Fully-closed Control Mode was selected, and the electronic gear object ratio was not 1:1. • The number of bytes (objects) mapped to RxPDO is 0. • 11 or more objects were mapped to RxPDO. • 12 or more objects were mapped to TxPDO. • Reference Position for CSP (4020 hex) was mapped to TxPDO when the communications cycle was set to 250/500 μs or when the electronic gear object ratio was not 1:1.	• Check the communications cycle settings or the electronic gear object. • Check the communications cycle settings or control mode settings. • Check the communications cycle settings or the mode of operation. • Check the communications cycle settings or the number of bytes of mapping. • Check the number of bytes of mapping or the parameters for the control mode settings. • Check the number of mapped objects. • Check the mapped objects.
95	0 to 4	Motor mismatch	The Servomotor does not match the Servo Drive.	Replace the Servomotor with a Servomotor that matches the Servo Drive.
Other numbers		Other errors	The control circuit malfunctioned due to excess noise or some other problem. The self-diagnosis function of the Servo Drive was activated, and an error occurred in the Servo Drive.	• Turn OFF the power once, and turn it ON again. • If the error is displayed even after the power is turned ON again, the system may be faulty. Stop using the system, and replace the Servomotor and/or the Servo Drive. Return the Servo Drive to the dealer that it was purchased from and ask for investigation and repair.

Troubleshooting Errors Related to EtherCAT Communications

Error number		Name	Error timing	Cause	Measures
Main	Sub				
83	1	EtherCAT state change error	Occurs during operation.	A communications state change command was received for which the current communications state could not be changed.	Check the specifications of the communications state change command for the host controller.
	2	EtherCAT illegal state change error	Occurs during operation.	An undefined communications state change command was received.	Check the specifications of the communications state change command for the host controller.
	3	Communications sync error	Occurs during operation.	The number of consecutive errors in receiving data during the communication sync time exceeded the value specified for the Communications Control Setting.	• Connect the EtherCAT communications cable correctly. • Check to see if the EtherCAT communications cable is exposed to excessive noise. • Check that the host controller completed communications before a interruption is generated in the synchronous cycle (SYNC0 cycle).
	4	Sync Error	Occurs during operation.	Control PCB error	Replace the Servo Drive.
	5	Sync Manager WDT Error	Occurs during operation.	PDO communications were stopped for more than the specified period of time.	• Check the operation of the host controller. • Connect the EtherCAT communications cable correctly.
88	0	Node address setting error	Occurs when the power supply is turned ON.	The node address that was read from the rotary switches was not between 00 and 99.	• Turn OFF the power supply, then turn it ON again. • Replace the Servo Drive.
	1	ESC initialization error	Occurs when the power supply is turned ON.	Control PCB error	• Turn OFF the power supply, then turn it ON again. • Replace the Servo Drive.
	2	Interruptions Error	Occurs when the power supply is turned ON.	Control PCB error	• Turn OFF the power supply, then turn it ON again. • Replace the Servo Drive.
	3	SII verification error	Occurs when the power supply is turned ON.	Control PCB error	• Turn OFF the power supply, then turn it ON again. • Replace the Servo Drive.

Error number		Name	Error timing	Cause	Measures
Main	Sub				
90	0	Communications setting error	Occurs when the power supply is turned ON.	• An out-of-range value was set from the host controller. • A command that changes the communications state to an unsupported state was received.	• Make EtherCAT communications settings such as the synchronous cycle (SYNC0 cycle) correctly. • Check the specifications of the communications state change command for the host controller.
91	1	Command error	Occurs during operation.	• When bit 9 (Remote) of the Statusword (6041 hex) was set to 1 (remote), and the Servo Drive was in operation enabled state (Servo ON), a command that changes the communications state from Operational to another state (Init, Pre-Operational, Safe-Operational) was received. • An unsupported number was set in Modes of operation (6060 hex). • CSV or CST was set in Modes of operation (6060 hex) during fully-closed control. • The Modes of operation (6060 hex) was switched in less than 2 ms. • The homing operation was started when the Homing method (6098 hex) was set to a value other than 8, 12, 19, 20, 33, 34, or 35. • The data setting warning (Warning No. B0 hex) occurred in a row, exceeding the Data Setting Warning Detection Setting (3781 hex) value.	Check the command specifications of the host controller.